INTEGRATED DEVELOPMENT PROJECT MANAGEMENT

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ABSTRACT

This paper tries to describe the differences, similarities, strengths and weaknesses of product development and other development projects from an empirical point of view, with the intention of constructing an integrated development project model. Here, the integrated development project model covers all kinds of internal business development projects, product development projects and product improvement projects. Formal project management practices in product development and a lack of them in development projects (IT, process etc.) have been demonstrated by empirical data. It seems that combining strength of product development projects with development projects could bring benefits at company level through both efficient project management and systematic change management.

1 INTRODUCTION

A common way of carrying out product development is to do it through projects. New Product Development (NPD) projects and the success factors of NPD have been studied in numerous articles and books [e.g. 1, 2]. Further, the development of processes and systems is being done increasingly through projects. In the literature, both project management practices [e.g. 3, 4] and on the other hand change [e.g. 5, 6] are abundantly represented. However, companies have too many development projects running and consequently do not have enough resources to implement change. Furthermore, companies need to compare their projects more against their strategy. Many examples can be found of linking strategy and project management. Grundy [7] used strategy management tools to improve the effectiveness of project management. Hauc and Kovac [8] listed the researchers studying strategy implementation as project management. Effective project management methods are needed because of the complexity of strategy implementation. Hauc's and Kovac's strategy process includes strategy implementation projects; the project definition phase starts during the strategy process.

2 DEVELOPMENT PROJECT MANAGEMENT

This paper attempts to answer the following research question: Can new product projects and internal development projects be managed with the same management system? The question has arisen from the author's experience of practical development work. Especially in process development work but also arguably in IT development projects, difficulties will be encountered because of unclear project scope, lack of resources due to daily business work, lack of top management sponsorship, etc. Many similar challenges have been solved through formal new product processes in NPD [9]. Again, process development projects have special characteristics that are applicable to NPD projects. Above all, the project management culture, methods and tools are broadly studied and applied in practice through numerous project management handbooks etc. [e.g. 10] In addition, an integrated development project model can be used in a construction in which strategy implementation or deployment are done through projects.

Shenhar et al. [11] classify development projects first into internal and external and then divide them into operational and strategic projects. Cleland [12] uses the terms 'product' and 'process projects'. In this paper, development projects include all kinds of internal business development projects. By contrast, product development projects also include technology development projects and product improving projects. The reason technology development projects are related to product development instead of internal development is that both have mainly or almost the same formal processes, and these are often associated at an organisational level. In the model, both development project types borrow ideas from each other. In addition, the integrated development project includes an idea of continuous product innovation [13] where product innovation is a continuous process of knowledge creation, and all cross-functional teams, not only R&D teams, have responsibility for innovation — an assumption on which the model is based in a process- and product-oriented company. Moreover, all development work is projected; furthermore, the projects either improve processes or develop and improve products. In practice, the degree of projected development work depends on companies and their project culture.

Constructing an integrated development project system simultaneously enables a company to simplify its project management system. A correlative of simplifying is better understanding the processes in cross-functional teams. Furthermore, integrated project management practices enable the same project portfolio management system to be used [14]. This offers greater potential to use development projects as a tool of strategy implementation. In an integrated model, commonly used stage gates with review practices in new product processes will form part of the development projects also. After given check points, a project will continue according to the original plan or a revised one; it will be either be boosted or dropped completely. Development projects would benefit from the creativity and commitment of R&D project groups, because in too many cases a development project vies for attention with daily business interests. New product projects have a very concrete end point. In contrast, development projects often trail off inconspicuously.

3 METHODOLOGY

The research is based mainly on interviews. The semi-structured interviews were carried out in November–December 2003 with 10 Finnish industrial companies among the 20 best known development-oriented firms in the country with their own brand, products and manufacturing. The companies' main characteristics are listed in Table 1. Both customer products and B to B product businesses were covered. Furthermore, two IT companies were interviewed as project management specialists comparing traditional industry companies. The size of the interviewed organisations varied from medium to large. Most of the interviewees were vice presidents of technology at concern or organisation level in cases where the company head office was abroad. In three interviews there were two interviewees present.

Table 1. *Main characteristics of interviewed companies.*

Company	Industry branch	Markets (mainly)	Size	Dispersion of operations	Dispersion of NPD	Interview concern	Interview concern
A	Electrotechnical	B to B	Large	Global	Global	Action in Finland	R&D and DP
B	Metal	Consumer, B to B	Medium	Multi-national	Mainly national	Action in Finland	R&D and DP
C	Machine	B to B	Medium	Multi-national	National	Corporation	R&D and DP
D	Metal	Consumer, B to B	Medium	Multi-national	National	Corporation	R&D and DP
E	Machine	B to B	Medium	Multi-national	Mainly national	Corporation	R&D and DP
F	Vehicle	Consumer, B to B	Medium	Multi-national	Mainly national	Action in Finland	R&D and DP
G	Machine	B to B	Medium	Global	Multi-national	Corporation	R&D and DP
H	Telecommunication	Consumer, B to B	Large	Global	Global	Corporation	DP
I	Telecommunication	Consumer, B to B	Large	Multi-national	Multi-national	Action in Finland	DP
J	IT	B to B	Medium	Multi-national	Multi-national	Unit	DP

4 RESULTS

The number of NPD projects starting every year varied from one to twenty-five and product improvements projects from five to ninety. Further, the number of other development projects varied from one to thousands. There were differences between project durations; product development projects had been carried out in one to five years and product improvement from two months to one year; process development projects had been carried out mostly in one year, but IT projects in two to three years.

All companies except for one (6/7) had formal, systematic new product processes, their own modification of the Coopers [9] stage-gate model. Further, product development was organised mainly on a project basis in product development organisations. By contrast, process development — here broadly understood as containing IT development etc. — was organised generally much less clearly than product development, because the development process owners varied, and normally process development was decentralised around the organisation or was not defined at all. Those mainly responsible for development work were found in IT departments, quality functions etc. Organisations with strong process orientation decentralised each process development to the process owner. In the same way, a formal and systematic process of development was exceptional. The exceptions had further modified or were just modifying the development process to be equivalent with the product process or software development process (IT industry).

Next we look at the similarities and differences of NPD projects and process development projects, based on two forms used in the interviews that gave a positive proposition in five classes (from disagree to strongly agree). First, NPD projects were found to stick to a planned schedule better than other development projects, although not especially well. Second, new products appeared to be more in accordance with a plan than the results of

development projects. Third, customer needs were asked at different levels of exploitation. On the NPD side, it was claimed that the results of product development (products) correspond to customer needs. On the development project side, the claim was slightly less: customer feedback is used in development projects. Both claims rated on same level of "agree". Fourth, development project management focused equally on both development project types in three claims: 1) successful project management, 2) good sponsorship, and 3) chief executives follow the prioritisation of development projects. The two latter claims were rated higher by the NPD side than other development projects. The success of project management varied in both project types between companies. The fifth area covered was commitment and enthusiasm of the project team. The difference of team behaviours was clearly in favour of product development teams. Last but not least, a significant difference concerned the use of personal resources. In fact, NPD suffers continuously from a shortage of resources. Regardless, more powerful problems also arose in the interviews, such as organising development work in the context of process development along with other work like daily business.

Next the interviewees were asked to list the characteristics of successful projects. The answers were classified into three categories: results of projects, success of project management, and effects of projects on business. The NPD side emphasised results, whereas the development side emphasised project management practices. Direct effects on business were not ranked so high in either project type. From the companies' point of view a successful NPD project result surpasses market expectations. The result is understood broadly as being a product platform or a product family, not just one product version. Furthermore, for technical products it was considered extremely important to be first on the market, because technically-oriented customers are ready to act as leading customers. Other characteristics of a successful development project included a tight scope from definition to the end.

The interviewees listed 1-4 strengths and weaknesses from their own project management in both project types: NPD and processes development. Project management strengths and weaknesses fall into the following categories: knowledge, results, strategy linking, project know-how, commitment, and understanding of customer needs (see Table 2). Among the most important success factors, companies listed knowledge occurring through strong product-related technology know-how, and know-how of processes and IT on the development side. Another success factor of NPD project management was an understanding of customer needs. This ranked very highly on the list of targets of development. Among the weaknesses were listed the need for mass customisation, application know-how and service business. At any rate, the most focal development target is management of development projects, including time scheduling, project planning, resourcing, etc. On the NPD side the next development targets seem to be gathering of tacit knowledge (consequence of ageing and networking). However, one important weakness of development projects is the project results. Therefore, implementation and upkeep of changes were seen as challenging tasks.

Table 2. *Success factors in project management, from companies' own point of view, and next targets of development.*

	Strength		Target of development	
	NPD (n 7)	DP (n 10)	NPD (n 7)	DP (n 10)
Knowledge	9	5	7	0
Results	3	4	0	8
Strategy and objective linking	2	2	2	2
Project know-how	4	3	4	17
Commitment	0	3	0	2
Understanding of customer needs	4	0	6	0

There are two main sources of development projects, namely internal sources and external sources (see Table 3). Most product ideas arise from the markets themselves. Many of the companies said they do not to follow markets, i.e. are not market-driven, considering themselves rather to be market drivers with a better understanding of customers' needs and processes (in B to B business) than their competitors. Surprisingly, external idea sources for other development projects and programs were few. The significance of a technology agency's or research institute's programs, network partners, consultants etc. did not rate very high. External sources were more like benchmarking, following the best practices, and management literature. Internal development ideas came from both process owners and top managers. Internal benchmarking of processes and units was often mentioned.

Table 3. *Source of project ideas.*

Source of project ideas	NPD (n 7)	DP (n 10)
External	**14**	**5**
Markets pull	12	2
Technology push	2	3
Internal	**8**	**18**
Strategic view	3	4
Other internal	5	14

One hypothesis was that projects were not killed even though the product processes had checkpoints. According to the data, checkpoints were used to check that the requisite work had been done, not whether the project should continue. Interruption of new product projects was said by all seven companies to be the exception rather than the rule. Interruption of other development projects varied: three companies said there is none, three said there would be an interruption in the case of an organisational or strategy change, one said there would be more interruptions than for NPD projects, and two said yes, there are interruptions. Some of interviewees said that there would be a need to interrupt more. Further, portfolio management including program management was not broadly used in the interviewed companies (3/10 in NPD, 1/10 in DP).

The role of IT projects among development projects was, as predicted, extremely important. IT orientation appears particularly in answers concerning the most important development projects of the recent past, current period and in the future. As a matter of fact, among traditional industry companies (7), all have ERP and other IT system projects listed. The number of updates and changes in IT systems is explained by four of the companies entering into a new organisational arrangement like fusion etc. Still, such reorganising does not explain why the overall significance of IT projects when measured by numbers, money and resources is so big. Some smaller companies, which have not properly organised their process development, do all their improvement work through IT development.

5 CONCLUSION

This paper describes the premises for a model of integrated project management. Similarities and differences have been found between the two project types: development project and NPD project. Formal project management practices were more commonly used in new product projects than in development projects. Furthermore, development potential has been recognised in both project types, actually more so than expected. Companies have realised it themselves, too. Further study is encouraged by the two examples of using integrated models in practice. The primary hypothesis is that project management practices are broadly implemented, and the next step is to manage project portfolios [14, 15, 16] instead of separate projects.

To conclude, what is most essential in NPD projects is an excellent outcome — i.e. a product — rather than how well the product actually meets the specifications and customer needs. Thus, development projects are measured and rated more according to how the project is run, the effects on quality and productivity etc. In both project types, goal achievement is strongly emphasised. Further, clear objectives and a tight scope are seen as remarkably important in development projects. Moreover, there are differences in project duration; development projects last normally less than a year, but companies will hurry the time-to-market or time-to-profit [see 17] so that time spent on product development is in practice (not only in speech) counted in months instead of years.

There seems to be a reason in a project-oriented company to combine elements of the both project types. The reason for basing the integrated project management model on the stage-gate model is its familiarity to organisations and benefits of gate reviews etc.

6 DISCUSSION

The study pointed out the relevance of the integrated development project model. More needs to be studied concerning linking NPD and other development projects to the same project management model. In the model under construction, attention should be drawn to its adaptivity to different level projects, from continuous improvement to strategic development. Also, more study should be done on the advantages and disadvantages of using the integrated model. One challenge is to put add a continuous innovation aspect to the model.

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